

CLAIMS

What is claimed is:

1. 1. A method comprising:
 2. forming at least one metal layer having a standing-wave structure to distribute a clock signal to receiver end points from a clock source such that the receiver end points are substantially electrically equivalent with respect to the clock source; and
 5. embedding the metal layer in a dielectric layer made of a thick film using a wafer-level thick film (WLTF) process.
1. 2. The method of claim 1 wherein forming comprises:
 2. forming at least the metal layer having the standing-wave structure in one of an M-ary tree and a combination of M-ary trees of different degrees M.
1. 3. The method of claim 1 wherein forming comprises:
 2. forming at least the metal layer having the standing-wave structure in one of a two-dimensional configuration and a three-dimensional configuration.
1. 4. The method of claim 1 wherein forming comprises:
 2. forming at least the metal layer having the standing-wave structure in a stacked-die configuration.
1. 5. The method of claim 1 further comprising:
 2. forming a via layer below the metal layer.
1. 6. The method of claim 5 further comprising:
 2. forming a back end of line (BEOL) layer below the via layer and on a substrate.
1. 7. The method of claim 6 wherein forming the BEOL layer comprises:
 2. forming a BEOL layer made of copper and dielectrics.
1. 8. The method of claim 1 wherein forming comprises:
 2. forming at least one power delivery area on the metal layer.
1. 9. The method of claim 1 wherein embedding comprises:

2 embedding the metal layer in dielectric layers made of benzocyclobutene
3 (BCB).

1 10. The method of claim 1 wherein forming comprises:
2 forming the metal layer having a thickness between 10 microns to 50 microns.

1 11. A device comprising:
2 dielectric layers made of thick film; and
3 at least one metal layer embedded in the dielectric layers and having a standing-
4 wave structure to distribute a clock signal to receiver end points from a clock source
5 such that the receiver end points are substantially electrically equivalent with respect to
6 the clock source.

1 12. The device of claim 11 wherein the standing-wave structure is one of a
2 M-ary tree and a combination of M-ary trees of different degrees M.

1 13. The device of claim 11 wherein the standing-wave structure is in one of
2 a two-dimensional configuration and a three-dimensional configuration.

1 14. The device of claim 11 wherein the standing-wave structure is in a
2 stacked-die configuration.

1 15. The device of claim 11 further comprising:
2 a via layer below the metal layer.

1 16. The device of claim 15 further comprising:
2 a back end of line (BEOL) layer below the via layer and on a substrate.

1 17. The device of claim 16 wherein the BEOL layer is made of copper and
2 dielectrics.

1 18. The device of claim 11 wherein the metal layer comprises:
2 at least one power delivery area.

1 19. The device of claim 11 wherein the dielectric layers are made of
2 benzocyclobutene (BCB).

1 20. The device of claim 11 wherein the metal layer has a thickness between
2 10 microns to 50 microns.

1 21. A die comprising:
2 a substrate; and
3 a metallization layer on the substrate, the metallization layer comprising:
4 dielectric layers made of thick film, and
5 a metal layer embedded in the dielectric layers and having a standing-
6 wave structure to distribute a clock signal to receiver end points from a
7 clock source such that the receiver end points are substantially
8 electrically equivalent with respect to the clock source.

1 22. The die of claim 21 wherein the standing-wave structure is one of an M-
2 ary tree and a combination of M-ary trees of different degrees.

1 23. The die of claim 21 wherein the standing-wave structure is in one of a
2 two-dimensional configuration and a three-dimensional configurations.

1 24. The die of claim 21 wherein the standing-wave structure is in a stacked-
2 die configuration.

1 25. The die of claim 21 wherein the metallization layer further comprises:
2 a via layer below the metal layer.

1 26. The die of claim 25 wherein the metallization layer further comprises:
2 a back end of line (BEOL) layer below the via layer and on a substrate.

1 27. The die of claim 26 wherein the BEOL layer is made of copper and
2 dielectrics.

1 28. The die of claim 21 wherein the metal layer comprises:
2 a power delivery area.

1 29. The die of claim 21 wherein the dielectric layer is made of
2 benzocyclobutene (BCB).

1 30. The die of claim 21 wherein the metal layer has a thickness between 10
2 microns to 50 microns.